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VOL. 2. CHATTANOOGA, TENN., OCTOBER, 1902 NO. 2.

THE SUMMATION OF CAUSES IN DISEASE AND DEATH.

President's Address Sixth Annual Meeting of the A. O. A. at Milwaukee, Wis.

E. R. BOOTH, PH. D., D. O., CINCINNATI, OHIO.

Every scientific physician looks for a cause or a number of causes for the conditions which manifest disease. Those less scientifically inclined are content to look for symptoms and treat them according to the principles of empiricism. The latter method looks upon the signs or symbols as the realities and treats upon the "cut and try" principle. Osteopathy has opened up an entirely new field for thought as to the causes of disease. It seeks the original or primary causes and does not recognize any cure except by the removal of those causes. True, it may give relief by aiding nature so as to remove symptoms; but that is not scientific osteopathy, nor is it the ultimate end towards which we should work.

This new idea was first advanced by Dr. A. T. Still. These are his words as found in his autobiography:

"In the year 1874 I proclaimed that a disturbed artery marked the beginning to an hour and a minute when disease began to sow its seeds of destruction in the human body. That in no case could it be done without a broken or suspended current of arterial blood, which by nature was intended to supply and nourish all nerves, ligaments, muscles, skin, bones and the artery itself. (Page 218.)

"The rule of the artery must be absolute, universal and unobstructed, or disease will be the result. I proclaimed then and there that all nerves depended wholly on the arterial system for their qualities, such as sensation, nutrition and motion, even though by the law of reciprocity they furnished force nutrition and sensation to the artery itself, and further proclaimed that the brain of man was God's drug store and had in it all liquids, drugs, lubricating oils, opiates, acids and anti-acids, and every quality of drugs that the wisdom of God thought necessary for human happiness and health. (Page 219.)

"I believed that something abnormal could be found some place in some of the nerve divisions which would tolerate a temporary or permanent suspen-

sion of the blood either in arteries or veins, which effect caused disease (Page 107.)

"The cause can be found and does exist in the limited and excited action of the nerves only, which control the fluids of parts or the whole of the body." (Page 108.) This comprehensive statement covers the whole field, and it includes so much that it is almost impossible for the mind to grasp it in its full meaning. Therefore, it is necessary for us to specialize until we reach the definite, specific cause rather than the general condition.

PREVAILING VIEWS.

Let us merely name the causes of disease recognized by medical authorities: They are age, sex, heredity, nationality, race, climate, seasons, condition of soil, occupation, food, with time and manner of eating; drugs, including narcotics and stimulants; bacteria and parasites, cleanliness, worry, overwork or excessive exercise, underwork or lack of exercise.

These are condition which every physician should note; but to speak of them as causes is often incorrect. For example, old age is truly the cause in case of senility, in which death would result from the simultaneous giving way of practically all the physical powers. But if pneumonia, apoplexy or any other specific disease intervenes, there is evidently some other cause than age. Many people have almost perfect health in a climate in which a consumptive cannot live, while the consumptive may have almost perfect health in some other climate. Evidently climate is an important factor in all such cases, but the disease cannot be credited wholly to climate, else all would be affected alike.

Microbes have much to do with disease. But that they are the only cause no scientific man will claim. Not every person bitten by malarial-bearing mosquitoes (Genus Anopholes) has malaria. There must be some other cause for this condition. Nor is every one exposed to smallpox stricken with the disease. I knew a case last winter in which over 100 persons were exposed in closed rooms to a fully developed case, as shown by the presence of eruptions in almost every stage of development, pronounced in the Cincinnati Pest House a typical case; but not one case developed from the exposure. Some of those exposed had not been vaccinated. Evidently something else than the contagion is necessary to smallpox, or else something other than vaccination secures immunity.

The effect of drugs as a cause in disease is too often overlooked. The lesion in such cases is beyond the osteopathic sense of touch, but chemical and physiological sciences have demonstrated their effects. The injection of a large quantity of a virulent poison which would destroy tissues demands heroic action in the administration of an antidote. The immediate treatment by the osteopath does not differ from the old school methods. The after treatment comes clearly within pure osteopathic practice and differs from the practice of all other schools. Most poisons, on account of the small quantity taken, act more slowly and insidiously, and the removal of the poison permits nature to

restore the normal condition by eliminating the foreign matter and then regenerating the destroyed or deranged tissues. Concerning alcohol Cushing says: "Even the smallest quantities of alcohol tend to lessen the activity of the brain, the drug appearing to act most strongly, and therefore in the smallest quantities, on the most recently acquired faculties, to annihilate those qualities that have been built up through education and experience, the power of self-control and the sense of responsibility:" Bearing in mind the fact that practically all the development in education is by the extension of the processes of the nerve cells in the brain, principally in the cortex, a glance at Fig. 1 will make clear the effects of alcohol. Its presence in the brain destroys the newly-formed dendrites by first softening and swelling them as shown in the upper part of the figure, and prevents the growth of others.

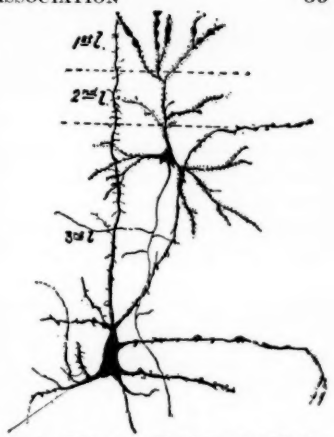


Fig. 1. *Cells of the Third Layer of Cortex of Brain.* **The enlarged portions of the fibers extending into the first layer show the first stages of softening and swelling due to alcoholic poisoning.**

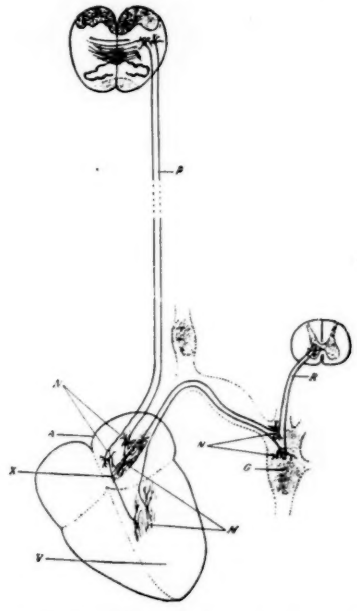


Fig. 2. *Regulating Nerves to the Heart.* **P, inhibitory fiber of the vagus terminating around ganglion cells at N, in the heart R, accelerator fibers from the cord terminating around ganglion cells at N′, in the stellate ganglion, G. N. and N′ are the points at which *nicotine, conine, curarine, etc.*, act. M. the termination of postganglionic fibers are the points at which *muscarine, atropine and cocaine* act.**

Nicotine, coniine and curarine act principally upon the terminal nerve fibers of the pre-ganglionic cells, that is, those that pass from the cord to the ganglia, and probably upon the ganglia themselves; while muscarine, atropine and cocaine act upon those of the post-ganglionic cells; that is, those that pass from the ganglion to the periphery, as shown in Fig. 2. These illustrate what the pharmacist calls the elective affinity of drugs for certain definite tissues. All drugs are destructive, but all do not destroy the same tissues. Almost all of them affect most markedly the nervous elements because of the greater complexity of their structure; and the nerve tissue especially the cell bodies can be reached only through the circulation. Hence the only hope of the physician is to remove the cause. This can be done first by withholding the poisons from the system and second by eliminating those already there. Prevention of ingestion so far as drugs are concerned is simply a question of prohibition; and elimination is easily accomplished in all ordinary cases, if circulation is normal and the excretory functions are given full

sway. Osteopathy has demonstrated its ability to accomplish these ends.

THE OSTEOPATHIC VIEW.

I trust that I have made my thought clear; namely, that there may be conditioning influences that will prevent, encourage or modify a disease; and that there must be one or more specific causes acting before the disease appears. The former may be called the determining or secondary causes; that is, they decide, in many cases, the nature of the disease when fully developed; the latter are the predisposing or primary causes; that is, the causes which make disease possible in all cases in which they exist, and inevitable in many cases. The latter are the ones that must always be sought for found and removed by the physician if he would accomplish the best results And every possible *causa causans* should be removed; for any one, however slight, may be sufficiently active to keep the recuperative powers below par and thus prevent complete recovery.

Putting into practic these ideas makes our work specific, definite, purposive. It robs medical practice of its indefiniteness, mysticism, empiricism. It is purely scientific and in its exactness is limited only by our limited knowledge of the structure and functions of the human body. It enables the osteopathic physician to make clear to the man or woman who has any idea of the structure and functions of the human body the cause of a diseased condition. To any one who can realize that the nerves are the conductors of a force which may be likened to electricity and that the blood and lymph vessels are tubes which may be likened to pipes conveying liquids, all of which are necessary to a healthy condition, the cuts in any standard anatomy or physiology may be made to proclaim the causes of disease and to predict what will be the result when the osteopathic physician removes obstructions.

ETIOLOGY.

Mark the contrast between the etiology of disease as given by the old schools and the new. The former seldom goes back of what are denominated the determining causes; the latter tells how the nerves are interfered with or how the fluids of the body are obstructed in their channels—pre-existing conditions without which there can be no disease. The former generally consider only the symptoms, as is evident, for example, in giving antikamnia for a headache, aconite for a fever, or digitalis for a weak heart. The latter may find the cause of the headache in a disturbed vertebra, of the fever in a poisoned blood supply or of a slow heart in an irritated vagus.

Every osteopathic physician is familiar with the fact that a lesion at a given place in different persons may not produce the same disease. In fact a very noticeable lesion in one case may be unattended by any symptoms of disease, or the results may be very slight, as in many cases of spinal curvature especially kyphosis. On the other hand, an apparently insignificant abnormality in structure may be fraught with the most serious consequences. Why these differences? I admit that the explanation may rest upon deductions that can never be shown to be based upon verifiable scientific facts. This is true because of the intricacy of the structure with which we have to

deal. For example, it is claimed that there are on an average at least 8,000 nerve fibers in each of the 62 nerve trunks (31 pairs) passing through the foramina of the spinal column. These fibers which are distributed to all parts of the body are motor, sensory, secretory, nutritional, vaso-motor, thermal, etc., probably arranged according to a plan yet unknown. Their minuteness seemingly makes it impossible in the living state to separate them and determine the function of each, and their close proximity to each other makes it seem impossible that some kinds of fibers should be molested in case of a lesion disturbing that nerve trunk and not others. But such evidently is the case. How can it be accounted for?

Suppose we have a disturbance along the distribution of the sciatic nerve or its branches—in the foot, for example. The lesion may be found that would affect one of the nerves that goes to form the sciatic. But why a circulatory disturbance in a certain case? See if there is not a lesion in the region of the lower dorsal affecting the auxiliary vaso-motor center to the limbs, or even at the atlas affecting the general vaso-motor center, or possibly at both. The two may be acting together to depress circulatory activity, but even the two together may not be destructive enough to interfere with function. Add to these influences an obstruction to the sciatic nerve and the effect will be felt first in the fibers of the nerve that are already handicapped by the interference with the source of the nerve force which they transmit. Any other nerve than the sciatic or any other functional manifestation than circulation may be subject to like conditions.

It is therefore most important that the osteopathic physician diagnose his case carefully. Feeling the pulse, looking at the tongue, taking the temperature, analyzing the blood or urine; in short, any or all of the methods of the old schools will not avail; neither will the hasty, indefinite examination of the lazy, incompetent or purely financial osteopath give data sufficient to insure the most speedy relief and a permanent cure. A lesion wherever found that may either directly or remotely produce the symptoms, must be removed. If one cause only is removed the principal symptoms may disappear; but the other causes stand as a menace and the danger from them may be greater than from the lesion the removal of which resulted in the disappearance of the symptoms.

PRIMARY CAUSES OF DISEASE.

I come now to a consideration of the direct or primary causes of disease from the osteopathic standpoint. These causes are to be found in anatomical derangements producing physiological disturbances. These derangements number legion. They may have originated in destruction by *poisons,* as already shown, in *tramatism,* in *exhaustion,* or in an almost imperceptible *pressure upon nerves or vessels.* In most cases they probably began by a slight injury, apparently too trivial to attract any attention at the time. Nature, of course, attempted to right the trouble; but she was handicapped in her effort by the demands of business, of social functions, of a false personal pride, of sheer laziness or of inexcusable negligence, until her forces were exhausted. Thus what should have been a temporary interference has become a constant oppression and the equilibrium of life is destroyed.

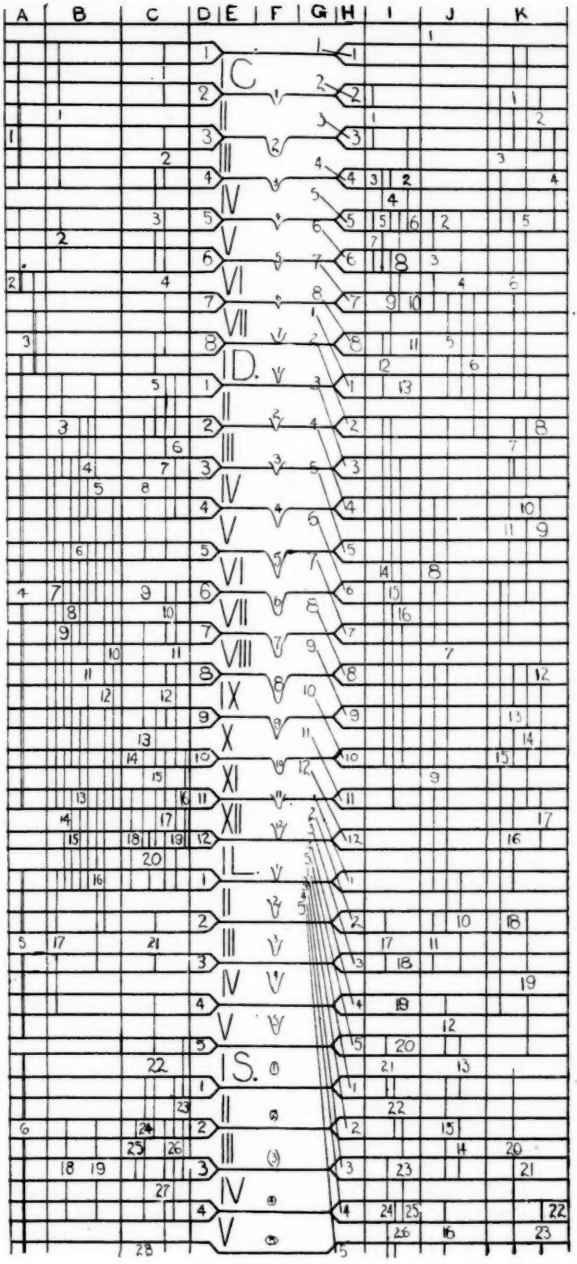
Traumatism, or a direct injury to any part of the body, is a primary cause of disease. The effect is produced by an actual destruction or derangement of tissues. Nature provides for taking care of all such cases. She will effect a cure except where there is great destruction of tissue, as in the loss of a finger, or where secondary causes prevent her from carrying out her purposes, as in infection by pathogenic germs. She accelerates the elimination of waste materials in and about the part and increases the repair elements in nutrition. This is done through the influence of the nerves; but the lymph and blood vessels are the conveyancers. Osteopathic procedure is perfectly rational in all such cases, very much in contrast with compressive bandaging, poulticing and drugging, so common in other schools of practice

Exhaustion may be a primary cause of disease. The best digestive tract may be so overworked as to exhaust its powers. The best brain may give way under the stress of long-continued work or worry. The nerves may not be able to supply longer the force necessary to carry on functions and maintain normal structure. Any use of drugs in such a case is only "adding insult to injury;" it is simply plying the jaded horse with a whip. Let the tired parts rest and recuperate and let the osteopath see that there is no obstruction of nerve force or nutrition to the exhausted parts and all will come out right If the exhaustion has gone so far as to destroy the nerve cells, regeneration is impossible and recovery, except by establishing function through collateral parts, cannot be expected.

All diseased conditions due to traumatism, exhaustion or poisons may be treated alike by all schools without any departure from their distinctive tenets so far as local treatment is concerned. But this is a very small part of the work that may be done by an osteopathic physician. He knows that the trophic influence to any injured muscle emanates from the spinal cord and at once sets to work to see that there is absolutely no interference at the origin or along the course of the nerves that supply life to the disturbed part Even if he finds no obstruction his resources are not exhausted, for he can stimulate to greater activity the nerves upon which work devolves, without danger of injury, by means known and used only by osteopathy; or he can use inhibitory procedures at least so far as to produce a temporary effect He will also see that the circulation to the part is unobstructed and that the centers supplying vaso-motor nerve force are in perfect working order.

No finite mind can enumerate the possible consequences of *pressure upon nerves.* I will take one case for illustration. Suppose there is a disturbance at the second dorsal and note the possible results as shown in the chart by a cross section at that point. Abnormal position or a thickening there might affect the first or second dorsal nerves as they pass through their respective foramina; the third in the cord, the fourth at its origin in the cord; also (but not shown in the chart) the fibers of the eighth cervical and the first, second, third, fourth, fifth, sixth or seventh dorsal afferent nerves as they pass out of the cord before reaching the place of disturbance.

Now take a glance at the chart from left to right at the level of the second dorsal and you will see that the sympathetic nerves of the upper thoracic region may be disturbed and affect the condition of upper dorsal vertebrae


A
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and the spinal cord, the thoracic aorta and its branches, and the heart and lungs through the pulmonary plexuses, as shown by the upper part of line 4 in column A. Vaso-motor action to the face, mouth, eyes, salivary glands heart and lungs, as shown by lines, 3, 4, 5 and 6 in column B, may be disturbed, which may be followed by disease of any of these parts caused directly by disturbed nutrition. Note also how it might disturb sensation to the upper extremities, the heart, and the lungs, as shown by lines 5, 6 and 7 in column C, and cause pain or silence the signal of distress which is always sent through the afferent nerves. Many of the muscles to the hands, the ribs and the back would be affected directly, as shown by lines 12, 13, 14 and 15 in column I; and through the reflex and automatic centers the ciliary muscles and those that move the eyeball may be disturbed, as shown by line 6 in column J. The familiar places for affecting the brain, eyes, heart, lungs bronchi, arms, etc., by osteopathic treatment are shown by lines 5, 6, 7, 8 and 10 in column K. It is not necessary to multiply illustrations. Pressure upon nerve tissue might be even more far-reaching in its results, as will be seen taking a cross section of the chart at different levels.

No osteopath will claim that all of these disturbances will appear at once. Omniscience would be necessary to tell just which nerve strands or fibers would suffer most from the pressure. In general we may say that those would suffer most that were disturbed elsewhere along their course, or were closely allied with other disturbed nerves. If the lungs were irritated the sensory impulse would aid in the irritation of every branch of the sensory nerve connected with the place of oppression. As in a rope, those strands give way first that receive the greatest strain, or are worn thin by greater friction, or are weak by construction, so those nerves succumb first that are most severely taxed, or are most sorely pressed, or are weak by heredity or lack of development.

Pressure upon vessels has a direct effect in preventing elimination of waste material and supply of new material. In other words, metabolism is interfered with. Stagnation of any fluid containing organic substances is always accompanied by disintegration. This is generally produced by the action of bacteria. Pure living blood flowing rapidly is the greatest of all known antiseptics. No bacteria can live long or propagate their kind in it. If all the channels for the conveyance of glood and lymph are open, every part of the body is furnished with an entire new supply of fresh blood about every half minute. In this way nutritive material is supplied to take the place of waste and worn out material, and all dead and foreign materials are carried away to be expelled by the emunctories before they can become a field for the propagation of bacteria.

Any abnormal position, size, or texture or any of the solid or semi-solid parts of the body must press upon and partially occlude some of these vessels. The results are inevitable and no trained osteopathic physician will underrate the importance of removing such a disturbing factor. The primary cause of a disease is already there. A diseased condition exists and it is not necessary to wait till symptoms appear by which we may be able to give the disease a name. Let the osteopathic physician do his work at that stage and the

disease will not progress beyond that point. But wait till pathogenic germs gain access and we have a rapid development of the disease superinduced by secondary causes; it may be diphtheria, tuberculosis, typhoid fever, etc.

THE VITAL ELEMENT.

Observe what Dr. Still says in the above quotation about the brain. In it is all "that the wisdom of God thought necessary for human happiness and health." From it emanates what we call life. But individual life as we know it and have to deal with it is coextensive with the entire individual organism. Interfere with that organism and we are just that far interfering with that God-given sumething that we call life. Stop that interference and we are destroying that which is acting at cross purposes to God's will Throw into the system one iota of anything destructive and we are waging war against supreme power and wisdom. Paralyze with an opiate the sensory nerve that is giving the signal of distress and we are tearing down the beacon lights.

Every nerve cell is the storehouse of vitality. Each has its part to do in the grand summation of life. Every nerve fiber is a passageway for those mysterious forces only during life. Each has its work to do. No conception of life is possible unless we look upon each neuron as possessing a certain responsibility. Its duty may be to produce motion, gather sensations, determine chemical changes, vary temperature, throw out secretions. We cannot conceive of such responsibilities without the endowments necessary to meet them. These are found in the nerve cell and its filaments. If this vital element is thwarted at any point in the body which it inhabits, by any of the causes named, it is not fulfilling its complete mission. Completeness of life is then impossible. All that goes to make up life is inherent in every normal individual; and all that ever was done or ever can be done to enable the body to remain the media for the manifestation of individual life comes unmistakably within the scope of osteopathic principles and practice.

MEETING OF NEW JERSEY OSTEOPATHIC ASSOCIATION.

A meeting of the New Jersey Osteopathic Society was held on Sept. 20, 1902, at Asbury Park, N. J. The attendance was large and much business of importance was transacted. Drs. Nettie J. Whitsell of Elizabeth, Ella F. Starr of Passaic, J. F. Starr of Passaic and Ed. W. Tate of East Orange were elected members. It was decided to adopt a code of ethics. Drs. Granberry and Novinger gave an interesting report of the convention at Milwaukee. The next regular meeting will be held Oct. 25 at Trenton, N. J. An interesting program has been arranged, including clinics, papers and discussions. The society is growing in strength and usefulness and has much important work cut out for the future. The officers of the society are: President, Dr. W. J. Novinger, Trenton, N. J.; Vice-President, S. H. McElhaney, Newark, N. J.; Secretary-Treasurer, G. D. Herring, Plainfield, N. J.

GEO. D. HERRING, Secretary.

THE PHYSIOLOGICAL BASIS OF THE THERAPEUTIC LAW.

Paper read before the American Osteopathic Association, at Milwaukee, by J. MARTIN LITTLEJOHN, PH. D., M. D , D. O., LL. D., President of American College of Osteopathic Medicine and Surgery, Chicago, Ills.

INTRODUCTION—GREEK IDEA.

The history of medicine has been one continued medley of therapeutic changes. In Homeric Greek days professional medicine and surgery were represented by Machaon, whose special attention was devoted to healing injuries, and Podalirius, who had the hereditary gift of "recognizing what was not visible to the eye and tending what could not be healed." In the Asclepiad era moral and dietetic measures were adopted without the use of drugs, the first records of cases being made on the walls of the temples. This was, however, entirely distinct from the more primitive form of medicine. The Greek conception of the physician embodied itself in the Hippocratic ideal in which we find, (1) a profound conception of the sanctity of the profession and its claims for honesty, sincerity and morality; (2) great skill in the discharge of professional duties; (3) the disease in the patient represents a process governed by internal laws equally with life and health, according to which there was a natural history of disease developed in the so-called symptoms of disease of clinical medicine; (4) the dominating theory of disease was that of the humors, blood, phlegm, yellow and black bile, being supposed in health to be in proper proportions, whereas in disease these were irregularly distributed or in improper proportion; (5) consequent upon this theory of disease was the theory of cure, depending primarily upon the curative power of nature, certain natural processes through which the humors pass, especially in acute diseases, marking the progress of disease towards resolution, crisis and recovery in connection with the expulsion of the excess through the channels of excretion. Diet was of first importance, medicines in the sense of drugs being of secondary importance, in chronic diseases diet and proper exercises being of the greatest importance.

THE ROMAN ERA.

Roman medicine was a development of early Greek medicine and as personified in Galen we find the temperaments based on the Hippocratic humors, the normal temperaments depending on the proper proportion and distribution of heat, cold, wet and dry, the abnormal in improper proportion and distribution of these. Galenic therapeutics recognized in drug substances the same elementary qualities, cure taking place on the principle *contraria contrariis*. Galen's influence held full sway in autocratic medicine till the eighteenth century. In the sixteenth century Paracelsus regarded the body as a microcosm corresponding to the macrocosm of nature, nature being sufficient for the cure of most diseases, art being required only when the man himself becomes exhausted or is insufficient.

The Greek and Roman conception thus mark the therapeutic history of healing up till modern times.

THE STARTING POINT OF THE MODERN IDEAS.

The 17th century gave birth for the first time to distinctive systems founded upon the discoveries and development of physiology. Borelli of

Naples sought to explain the functional activities of the body on physical and mechanical principles, movements of bones and muscles being explained on the theory of leverage, digestion being a trituration process, nutrition, secretion and excretion depending upon pressure and tension in the vessels. Traditional medicine dismisses the contributions of the iatro-physical school as belonging to physiological history as if physiology were outside the realm of healing. About the same time the English Sydenham claimed that disease represents the efforts of nature to restore health to the patient by the elimination of morbid products from the system. The iatro-physical school under the influence of the Newtonian principles of physics developed in Britain under Pitcairn and Cheyne, who attempted to explain life and disease on mechanical principles. Friend applied the same principles to the phenomena of menstruation. Richard Mead and James Keill applied the mechanical principles to the explanation of the body functions. These are the precursors of the new pathology, etiology and therapeutics of disease.

THE FUNDAMENTAL PRINCIPLES.

The body consists of different kinds of matter, this matter being arranged in tissue form and these tissues having, (a) similarity in origin from a common bioplasm, and (b) dissimilarity in their molecular composition, manifested in microscopic structure and dissimilar forms of activity. These tissues differing in structure and in mode of activity are variously arranged in mechanical adaptation and adjustment to form organs, by means of which the different activities are given special direction. This organ arrangement ranges all the way from the mechanism of the central nervous system in which the mechanical structure consists of minute cells and fibres, to those organs as in respiration and circulation in which the mechanical factor predominates.

Hence the physiology of the organism must take account of, (1) the processes that take place in the microscopic tissue constituents, the cells. These processes are chemical, physical or chemico-physical and represent *molecular activities;* (2) the processes that result from the tissue activities, these activities being modified and controlled by the *mechanical* adaptation of the particular tissues; (3) the fact that all these processes are intimately related to and dependent upon the *vitality* which animates the organism as a whole, its constituent elements and organs. Hence the discussion of physiological processes must take place from the *molecular, mechanical* and *vital* points of view, these three characteristics being associated with every part of the organism and all its functions.

THE MASTER TISSUES.

The great tissues are the nervous and muscular, all the rest of the body acting simply as a help and protection to the muscular and nervous systems, or as a complex machinery to supply these master parts of the organism with food and oxygen through the medium of the blood, to clear away the waste from the tissues and to keep up the normal temperature of the different tissues for normal activity.

In these *the blood* is the agent and medium and the body may be regarded

as a complex mechanism for the transformation of food and oxygen into blood, removing the waste from the system and maintaining the normal body temperature. The blood function is performed in connection with bioplasmic cells whose processes are *partly molecular, partly mechanical* and *partly vital.*

Hence the physiology of the body inquires into, (1) the principles and laws that regulate the transformation of food into body substance and regulate the katabolism of the body substance into waste products; (2) the laws and principles which regulate the origin and distribution of nerve vibrations, their relation to muscular contraction, the secretory processes and the different forms of tissue activity; (3) the laws and principles which regulate the generation of nerve vibrations in connection with the *molecular, mechanical* and *vital* processes of the tissue cells, the relation of the chemistry of energy to the vitality of energy and the relation of vital energy to movement, rhythmic mobility, feeling, thought. These are the fundamental physiological principles that underlie therapeutic action and therapeutic law.

ETIOLOGY, PATHOLOGY, SYMPTOMS.

Historically the change from the normal in the body has been interpreted by symptoms or signs. The pathology of objective disease has, however, emphasized the change in the structural constituents, the cells. But normal function depends upon the normal chemico-physiological consituents, the vital adjustment of which means the freedom of the life forces and a state of orderly health. The cells and tissues form the living body and these sustain physical, chemical and vital relations within the organism, the processes of nutrition in connection with the cycle of metabolism representing the foundation of the continued organic life. The fundamental principle is the cell condition, changes in the cell modifying the metabolic cycle.

THERAPEUTICS—EMPIRIC.

To meet this, empiric medicine used substances to modify the chemical reaction and scientific medicines uses the exact analytical and synthetic principles of chemistry to combat these changes. How? To control the organic processes of the cell life, not by producing changes, but by regulating the responsive activities o the cells in their metabolic changes, so as to restore the equilibrium of cell life.

THERAPEUTICS—PHYSIOLOGICAL.

Physiology suggests two principles, (1) the correction of maladjustment, the removal of obstructions and the co-ordination of the life forces, fluids and processes by the removal of every abnormality to perfect adjustment; this means the correct machinery; (2) eliciting a respnse from irritable tissues and mobile cells, whether on the basis of acceleration or retardation. The nervous system is an automatic mechanism and the most important parts perhaps of it from the point of view of co-ordinating the streams of nerve vibrations that penetrate the entire organism are the dendritic branches by means of which a process of switching is carried out in the distribution of the physiological impulses to the different organs and func-

tions. These dendrites have even the power of insurrection or boycott, breaking the circuit of impulses in such a way as to interrupt co-operating relations between organs. It is this that interferes with the community of cells frequently when no distinctive lesion is found in the structural machinery.

THE PRINCIPLE OF THERAPEUTICS.

There is a law or principle of therapeutics. Can we discover it? According to Dr. A. T. Still, "a disturbed artery marked to an hour and a minute when disease began to sow its seeds of destruction in the human body. That in no case could it be done without a broken or suspended current of arterial blood, which was by nature intended to supply and nourish all sinews, ligaments, muscles, skin, bones and the artery itself. He who wished to successfully solve the problems of disease or deformities of any kind in all cases, without exception, would find one or more obstructions in some artery or some of its branches."

What does this mean? That the obstructed circulation results in the disturbed balance of nutrition, and consequently throws some tissues or organs into a state of mal-nutrition. Consequent upon this we find diseases of organs and tissues, tumors, cancers, etc. This places the unobstructed arterial blood at the foundation of health, every part of the body depending on this blood for nutrition. Here, however, we meet with a cycle. All life and life forms vibrate and pulsate in cycles. The arterial blood builds up and develops to function the nervous system, but the nervous system furnishes stimulus and even nutrition to the artery in order that it may pulsate in harmony with the master tissue of the body in the supply of food to the entire organism. Thus in the cycle of health, arterial control and nervous direction stand pre-eminent, and the law of cure must be that of uninterrupted arterial blood supply and unimpeded nerve control. What co-ordinates and unites these together? It is probable that we can never solve the why and wherefore of our present being, or tell just exactly how the organism assumed its present form and functioning. Out of a vitalized cell the organism is evolved in its entirety, all evolution being determined from within. Hence cell substance (protoplasm), limited by the enveloping cell wall. The biothe cycle of primary cell life must be resolved into that of nucleus (bioplasm) plasm is and contains the life force, determines toward itself from without all nutritive substances, vitalizing the substances, so as to form a basis for new nuclei for the karyokinetic process of development. When this process has gone on to maturity, the life principle determines certain combinations of cells in the formation of tissues and organs, the whole being bound together as an organism, maintaining an independent life and forming a unity.

THE VITAL ORGANS—HEART AND BRAIN.

In this organic unity, heart and brain seem to be in a special sense vital organs,—the brain is the great generator of force and fluid and heat, using as its accessories in this work all the organs of the body; while the heart, under the stimulus of the brain, which is a mass of neuron cells, rhythmically distributes the fluids, with all nutritive and medicinal substances, to the

remotest parts of the organism. These functions are reciprocal, form the corresponding or parallel sides of a cyclical progress; mutually help and stimulate each other to the great task of preserving and perpetuating in the individual or his progeny this organic existence.

TRUE THEORY OF CIRCULATION.

After centuries of physiological vagaries concerning the circulation Harvey discovered that the blood can flow only towards the heart and when flowing away from the heart is in the direction backward toward the heart again. For a long time it has been practically taught in the physiologies that the arterial flow is caused primarily by the heart contraction, the systolic influence causing it to move out and onward through the vessels. But experiment has shown the force of the heart to be insufficient to drive the blood through the tubelet system of capillaries. Attempts to inject the capillaries have demonstrated that a force sufficient to drive fluid through the capillaries, (1) must be greater than the heart force, and (2) such a force would increase the pressure to such an extent as to produce capillary rupture. Hence the key to the systemic circulation does not lie in the heart.

Comparative physiology indicates the true theory. The systemic circulation of the fishes is carried on without any heart, beginning and terminating in capillary systems without any central organ. Similarly the portal circulation begins in a capillary system of vessels in connection with the veins of the digestive apparatus. These unite in the common trunk of the portal vein which sends its ramifications through the liver substance, the portal blood passing into the capillaries of the hepatic veins which empty into the inferior vena cava.

Embryonically the nervous systems make their appearance before the framework of the vascular system. This vascular system forming a network of vessels through the body is actively and fully developed before any heart makes its appearance. The heart in fact is not completed till after birth. In some forms of monstrosity the circulation of the blood takes place without any heart. In the vegetable kingdom the circulation of the blood or sap begins in a minute capillary system in the roots, terminating in a minute capillary system in the leaves and vice versa. Here capillary force with endosmosis and exosmosis are sufficient to send the sap frequently hundreds of feet overcoming gravity with considerable ease.

CAUSES OF CIRCULATION.

What is the cause then of the circulation? It differs from sap circulation in plants because of the structure of the blood vessel walls. Between the outer layer of areolar tissue and the inner membrane wall lies the coat of muscular tissue. The circulation through the arteries depends upon the peristaltic contraction of these arterial wall coats of muscle. These walls act as a series of plates, sensitive and motile, so that the pulsation of the arterial system represents the pulsating current of vitality in the peristaltic contraction of the arteries.

The capillaries are not the terminals of the circulating system but the beginning of it. The heart is the terminal just as it is the last part of the

circulatory system to be developed. Hence it is subject to and dependent on the circulatory phenomena of the capillaries. The capilliaries represent ramifications in the structure of every organ and tissue of the body. Here the great fundamental work of nature is carried on, including heat generation, vital activities, body repair and renewal, the vitalizing processes in the different tissues. Here the pulsating rhythm of vitality takes origin, the heart being a general center within the continuous structure of the circulatory apparatus, where activities are co-ordinated, influences combined and made to co-operate. Hence the heart is not a force pump but a general co-operating center in connection with which the general vitality and life forces concentrate for distribution throughout the entire vascular and tissue system.

Thus the heart acts as a general center in connection with which the life processes, especially of vasculation, are co-ordinated and made to act together.

The neural impulses which produce this harmonious contractile action of the entire vascular system originate from the C. S. & S. systems, all the different parts of the vascular system being supplied by fibrils from these two systems. These fibers are aroused in connection with the center activity, the center activity depending especially for stimulation upon the oxygen taken into the system in respiratory activity, upon the food furnished to its nerve tissue as a result of digestive, metabolic and secretory activities in the respective organs, and especially upon thought, emotion and will when in active operation from the psychic side of life.

The heart then does not act as the great pumping force in the circulation, does not even regulate this action. It is simply a general resevoir and distributor which unites the various parts of the vascular system, co-ordinates their activities, the real stimulation of the circulation depending upon the peristaltic action of the minute blood vessel system called the peripheral system. This peristaltic action depends for regulation on the nervous system under "the guidance of vitality." The peripheral circulation thus becomes *the key* to *the circulatory function*. This explains the relation of the arterial wave of peristaltic action to the circulatory phenomena. It explains the failure of success in the use of cardiac stimulants and depressors, and indicates the only rational system of reaching the circulation, even the heart, by the action upon the peripheral blood system, and this especially through what is called the vaso-motor nervous system. This accounts for the success of osteopathic procedures when these are directed to the vaso-motor mechanism.

THEORY OF THERAPEUTICS.

The theory of our therapeutics depends on, (1) the vital force, which represents the sum of all vital activities and processes in the body organism, the cosmic energy in man, the energy of understanding and will; and (2) on nutrition, the tissues and organs depending for their vitality and vital activity upon nutritive conditions. Both of these are controlled from the brain. The brain centers represent the higher life, and the different paths from the brain to the body along the nervous system are pathways of distribution in connection with vital force and nutrition. In this we must take

account of brain nutrition, in connection with which we get (1) the production of a secretion, the cerebo-spinal fluid, and (2) the generation of nerve energy that passes outside of the brain in the form of waves of vibration.

BRAIN NUTRITION AND INFLUENCE.

The nutrition of the brain depends on definite changes in the brain, these being regulated by certain movements in which the lymph and blood play a most important part. In the case of other body organs like the liver these organs receive in all their parts an equal supply of blood when normal. It is different in the brain, because all parts of the brain are never acting simultaneously. Hence the difference in function forms the basis of the difference in blood supply to the different parts of the brain. The demand regulates the supply. The skull is an immobile structure and it limits the capacity of the cerebral blood supply.

The brain substance does not entirely fill up the cranium, lymphatic channels and reservoirs being within the brain in order to form a yielding base for the brain, not a solid structure like the cranial roof. In this yielding substance we find certain rhythmical movements. The brain acts on the body and controls the body, but body reacts on brain. We find brain movements corresponding, (1) with systole and diastole of the heart, (2) with inspiratory and expiratory changes, and (2) with the vascular variations of vaso-motion. Brain movements and blood pressure in the brain depend upon these three forces. Thus the variations in blood supply to the brain depend upon anatomical structure and physiological movements. Brain activity represented by these brain movements regulates blood distribution and brain nutrition. These movements are peristaltic, and when brought into relation to the mechanical motor power generated by the cranium give rise to the lymphatic and cerebo-spinal fluid circulation. The brain is nourished in connection with its blood supply, and at the same time metabolic changes give rise to lymph and cerebo-spinal fluid found in the sub-arachnoidal spaces and in the ventricles, passing down into the spinal canal thence along the path of all the spinal nerves, and also along the cranial nerves.

Hence the brain exerts a three-fold influence over the body, (1) *nutritive* through the influence it exerts upon the vaso-motor system, in virtue of which it selects the food materials from the blood that circulates through all the tissues and organs; (2) *trophic*, direct from the cerebro-spinal system, by the cerebro-spinal fluids, which passes out along the paths of the cranial and spinal nerves. This makes all tissues and organs trophic. If this is not normal, then the tissues or organs are in a state of mal-nutrition and liable to all sorts of diseases. The nutritive and trophic conditions are controlled by the neuron cells of the brain. Tissues that are non-trophic may grow by accumulating substance but do not develop by assimilation. Normal tissues are trophic when they are under the trophic control of the cerebro-spinal system, and are in this condition immune from disease. When non-trophic they are susceptible to disease; (3) the brain generates impulses that pass out to all parts of the organism through the nervous system to

maintain the tonic rhythmic, peristaltic or vibratile condition of tissues and organs. This mobility which is the characteristic of every tissue and organ is maintained by the perpetual stream of vibratile impulses from the brain towards every part of the body. Here we get the vibratility of the vital force.

PHYSIOLOGICAL AXIOMS.

1. The first pages of physiology bring out into prominence the *vital force* as that which lies behind the matter of the structure and the material functional of the body organism.

2. The basic principle that runs all the way through physiology is *order*, harmony and co-ordination, these being established by and through the nervous economy.

3. There can be no organo-disease or organo-therapy, because no organ of the body stands isolated and alone, the sympathetic relation of the nervous system making it imperative that the body be regulated as a commonwealth of cells.

4. The great medium of therapeutic action is the cerebro-spinal and sympathetic systems, these systems being co-ordinated, each system contributing an independent functioning to the united nerve mechanism. The former contributes control, especially in connection with its trophic function, exerted over all parts of the organism through sympathetic channels. The latter, vaso-motorly, regulates the blood supply and therefore the nutritive condition of the cerebro-spinal system. Any weakening of these united and co-ordinated nerve mechanisms renders therapeutic action less certain and may render it impossible.

5. The fundamental theory of physiological life is that of co-ordination, co-operation and adjustment. From the starting point of the embryological life we have the adaptation of the male and female elements in fertilization, the gradual progressive evolution of embryonic layers and cells, embryonic tissues and organs, until in the co-adapted organism we find the structural and functional adjustment of all the parts of the organism at the basis of vital manifestation. The structural framework is functioned in relation to the rhythmic activities of soft tissues and these in turn are regulated by the co-ordinate activities of four distinct motive powers, representing four definite planes of vital manifestation: (1) the reflex, (2) the automatic, (3) the voluntary, and (4) the volitional center activities.

6. The vitality of the nerve tissue is the basic life of the physiologic organism and this manifests itself upon these four planes of activity in connection with all the organs and organic expressions of life. The co-ordination of these within the physically and physiologically conditioned material body constitutes what we know of actual life, the expression of the deeper life principle and the life force.

THE FORCE OF NATURE.

There are certain forces,—sound, light, heat, electricity, etc. The physical basis of all these is vibration. Vibration is an accepted fact in science. Solid bodies are composed of atoms which are vibrating at almost infinite velocities. One substance differs from another mainly in the modulus of

vibratility, the different planes of substance representing the planes of gradually increasing vibratility. The higher vibratility governs and moulds the lower, just as the sun centralizes the solar system. The most refined vibrations that mean life and light, with all their accompaniments to the planets, in that solar system. In man this vibratile characteristic also predominates, for within his organism he combines the higher and lower grades of vibratility in connection with mind, brain, bone, muscles, blood. So long as these combined vibratilities are in harmony the organism enjoys life and health.

THE VITAL FORCE.

In man there is a vital force, so-called because there is no better term. It is not the vital principle or the soul or the subjective mind. It is the vital force, or that force which originates and remains in the body as the result of the union of spirit or simple substance with matter . It is the objective mind of the psychologist.

The principle of this vital force is the *power of fluxion*, or *of vibration*, which, as in the physical forces, can permeate the substance without affecting or modifying its substance. There are thus three planes, the pure *material*, the pure *spirit* or psychic, and the plane which originates in connection with the union of these other two, the *vital force* plane.

What is the plane of therapeutics? What is the plane of dietetics?

THE DIETETIC PLANE.

The plane of dietetics is that of pure matter, the food taken into the body passing throug a metabolic cycle, terminating eiter in being assimilated to the material tissues or else in elimination as unassimilated or unassimilable. Here we are dealing with crude substances, and the metabolic laws that regulate this cycle are two-fold:

(a) supply regulates the demand throughout the body, and

(b) demand regulates the supply throughout the brain tissues, on a nitrogenous basis.

This makes it imperative to supply food substances in proximate principle or crude substance form, and this means the antidoting of hunger or thirst by the appropriate *contraria* substance, that will fill the void and satisfy the material craving and appetite.

THE THERAPEUTIC PLANE.

In the therapeutic plane we are dealing with the nexus of spirit and body, and, therefore, with those vibrations or fluxions that lie at the foundation of the force called vital. On this plane crude materials cannot be of any service, because they are foreign to the force to be affected, and as such cannot enter the field of the vital force.

In the crude drug substance, (a) there is nothing refining, but everything is crude and material body substance, and as it is not the body material we are curing, as it isthe vital force we are adjusting, there must be a refinement compatible with the force to be affected; (b) increased vibratility is the principle of adjustment.

THE BODY CYCLES.

There are, it is true, the crude forms of changes in the body, (1) the metabolic cycle, representing hunger, thirst, etc. These demand the crude changing. Why? Beause the body has organs in which certain changing, refining and forming goes on; secretions are the nutritive supplies of the higher forms of tissue. (2) The *will cycle* depends upon vibration. Waves of vibration pass along the tissues. There is no function of the body that does not have peristaltic or rhythmic vibrations. How are we going to affect these? By affecting vibration in the substance used or in the treatment given.

VIBRATILITY IN CONNECTION WITH LIFE.

The time may come when we can measure the vital force by measuring its vibratility. We must approximate to this normal vibration. As the vibratility becomes less intensive man becomes less capable of reactive power, mental and physical decline follow. Some call it magnetism, electricity, life or vital potentializations. Is there anything to lead to determine potentialization? Sympathetic life or visceral life is cruder and represents a lower plane of vibratility, although higher in the scale of rhythmic pulsation. The cerebro-spinal is more refined and represents a higher plane of vibratility, although more inhibitory in its nature. Therefoe, the higher vibratilities appeal to the cerebro-spinal system. As most, if not all, functional activities represent co-ordinated sympathetic and cerebro-spinal activity, the medium vibratility represents the normal, changes depending on the capacity to react.

GUIDING PRINCIPLES.

(1) The principle of determination is from last to first, symptoms disappearing in the reverse order of their appearance. Why? The last to appear is the least entrenched in the system.

(2) The pathway of least resistance is the pathway of curative effects.

(3) There is a normal degree of vibratile force in the organism. A certain portion may be over-active or under-active.

This explains what seems to be organic disease. The curative principle is the economic distribution of these vital vibrations on the principle of adjustment, such as is compatible with life. Disease causes a redistribution of this adjustment, and in cure the vital force is directed to the orderly adjustment of the economy of vitality.

VALUE OF SYMPTOMS.

Symptoms are the voices of the patient, or the vital force of the patient, expressing the internal condition through the outer or superficial plane of manifestation. At first we find in the organism a life force and it is constantly struggling against death forces or disease causes during the life of the individual. These disease forces are accentuated by unhealthy environment. The vibratile life force of the patient resists these. This vibratile life force represents the inherent rhythmic vitality of every organ and tissue. Everything superficial represents the expressions of the physiological life through or from under the pathological, demanding aid for the physiological life, to help perpetuate and keep up the struggle for existence and to determine it in

favor of vitality. These exprssions may be, (a) *subjective,* what the patient feels, reports; (b) *objective* what the physician sees on the surface of the body or brings out by manipulations of the body or its parts, in any form of deviation from the normal.

THE LAW OF CURE.

To meet these the law of cure is *that of adjustment, co-ordination, co-operation.* All life represents force and the nature of this force is rhythmic or vibratile, because the disorder is *mal-adjustment,* the two possible conditions being above or below par or normal, and vibratility or motility can only be changed by something of its own nature. Hence the value of correcting the arterial wave and the nerve impulse.

THERAPEUTICS IS PHYSIOLOGICAL.

Is healing physiological or pathological? It is undoubtedly physiological So long as life persists there is a tendency to the normal. This is represented by the *reactive vital force* of the organism. To this we must appeal.

Are there indications of this curative principle in physiology? It is not to the pathological state or condition we appeal, but to the physiological. to restore order and remove the pathological. Therefore all healing must be physiological in its nature.

Are there are indications o this curative principle in physiology? It is this that lies at the basis of all mechanical systems of healing, the setting up of increase in or the checking of the vibratile impulses, the correction in the distribution of the normal vibrations sent out from the brain center of control and distributed by co-ordination from the different planes of center activity

ITS THREE-FOLD BASIS.

The curative work of any therapeutic system, if it is true, lies here. Curative action is three-fold: (a) *corrective,* establishing disturbed adjustment; (b) *stimulating,* increasing the local or regional distribution, and (c) inhibiting or checking and decreasing the local or regional distribution of the vital impulses.

What does nature do? *Nature does all the curing.* Every atom has a certain affinity for every other atom in the molecule. We call it chemical affinity. The law of gravitation has a centripetal and a centrifugal force, that is, drawing forces; and these forces, whether chemical or physical, have their homologue in the field of biology. The simplest living substance has an internal force which keeps all its particles determined to the organism. Plants grow in fixed forms, the form being definite, different from the formlessness of the inanimate. Here cohesion is a determining principle. This is energy or force and it is derived from the formative intelligence of the animal organism. This keeps all parts of the animal body—from the simple amoeba up to man—in order, and this order is the determining factor in functionings. On the basis of this energy or force, the great governing principle of the animal is adaptation. Dead substance cannot adapt itself to environment. This vital, operating and adapting force, which represents the *life principle* or construcive soul, keeps the body continuously *constructed*

and *reconstructed* on a definite and orderly plan, and this definite orderly plan is carried out by the executive officer of the organism, the *vital force* in connection with the vital impulses sent from its center to every part of the body.

CYCLES AT FOUNDATION OF THERAPEUTICS.

Here we have the foundation for, (a) the psychic cycle of the *will*, understanding and emotions, representing the volitional, voluntary and sensitive life of man; (b) the metabolic cycle of *anabolism*, *katabolism* and *rest*, representing the vegetative life of functional activity and development; (c) the reproductive cycle, in which certain organs are concerned in preserving the life from destruction, first, of the individual, and secondly, of the race, under the *vital force*, in connection with certain glandular activities, for example, the thyroid glands, suprarenal capsules, pineal glands, and the sexual reproductive glands. The most profound physiological principle illustrated in these glandular processes is *change of substance to the same character in order to assimilation, refining and double refining to reach the central bioplasmic life substance.* Poisons within the limits of the organism are detoxinated. If the system is overborne by poisons it cannot detoxinate. Then biological vitality gives place to chemical activity and the organism is in danger of dissolution and the separation of the different planes of vital activity from the central force of the organism takes place. In this case an antidote is demanded on the chemical plane, in order to prevent the central life principle and its forces from being overwhelmed by the toxic action of the poison. Poisons can have no therapeutic action, but simply an antidotal or katabolic action.

THE ORGANISM, A UNITY.

One of the central facts of the physiology is, that the *organism acts as a unity*, consisting of a mass of unit cells. These cells all act in unison and harmony whatever takes place. Hence if the body is diseased there must be

(1) *Lack of adjustment.*

(2) *Reaction upon the vital force* in the form of disturbance, obstruction or impediment to normal activity, and

(3) This reaction upon the vital force weakens certain functional activities and results in consequent tissue changes brought out in the field of morbid anatomy.

THE INTERNAL SECRETIONS OF THE ORGANISM.

The greatest doctrine of modern physiology is that of the internal secretions. These internal secretions represent the most perfect and refined metabolic products in the body. The cerebro-spinal fluid is a secretion of the brain representing the most highly vitalized fluid in the body; the thyroid secretion and the suprarenal secretion represent respectively, the stimulation to the vaso-dilator function of the cerebro-spinal nervous system and the constrictor function of the sympathetic system. The meaning of these secretions we take to be, that a refining process goes on in certain glandular structures of the organism to prepare the most highly nutritive and vital fluids of the body, and on these depend the trophicity of the organism.

PHYSICAL AND CHEMICAL VIEW.

It is being asserted very widely that physical and chemical processes fully explain the life of man. Even in some of the newer fields man is spoken of as a machine and all his activities are regarded as purely mechanical. Pure bioplasm is structureless, at least as far as the minute examination microscopically of it can show. It is free from granules, the broadest and most essential difference between bioplasm and non-living matter being that bioplasm has a remarkable capacity for movement. In fact mobility is the primary characteristic of bioplasm. Every form of living matter has mobility. This is not all. "Every nutritive act, every form of increase and multiplication, each kind of growth, the production of buds or offsets, the development the formation and increase of every tissue, involves active movement of the particles of which living matter is composed."

VITAL MOVEMENT WAVELIKE.

This movement in some forms of living matter is microscopic but no living matter can exist apart from some movement, because *vital movements are essential to life.* When these movements cease life ceases. The primary movements that affect every part of a mass of bioplasm are undulatory or wavelike, producing continual changes in the mass of the bioplasm. In the development of the constituent elements of a mass of protoplasm, there is a movement from the center to the circumference, the nuclei and the nucleoli forming new centers of development internally to the bioplasm ,these being vital centers growing out of centers of bioplasm already existing. As the constituent particles of bioplasm move from center to circumference, the fluid containing the nutrient matter or the non-living matter flows from the circumference to the center. As it reaches he center it becomes vitalized and then is determined the movement from center to circumference and so on *ad infinitum* while life lasts. In the movements of one part of a mass of living matter in relation to the rest of the living matter, the movement is peripheral, the first movement being along the line of least resistance.

Dr. Gideon Wells writes, "all metabolism may be considered as a continuous attempt at establishment of equilibrium by enzymes, perpetuated by prevention of attainment of actual equilibrium through destruction of some of the participating substances by oxidation or other chemical processes, or by removal from the body or entrance into it of materials which overbalance one side of the equation."

TISSUE MOVEMENTS ESSENTIAL TO LIFE.

In connection with the formation of tissue the amoeboid or locomotive bioplasmic movement is noticeable. This is especially true of the nerve tissue, although it is equally true of muscle and probably of all tissues. The most essential movements in the tissue when developed are, (a) *the movement of living matter from center to circumference,* and as a result of this, (b) the *movement of nutrient, non-living matter from circumference to center.* These are essential to life and life cannot exist and be perpetuated without these. The other movements are more or less accessory to these fundamental movements.

HOW THIS MOVEMENT TAKES PLACE.

In explaining these bioplasmic movements from the centers of life, it is essential to remember that the primary constituent of bioplasm is water, the solid being held in solution in the fluid. In the most minute particle of bioplasm there is a center of vitality. To this center nutrient matter comes from the circumference to be vitalized and to enter the cycle of perpetual movement from center to circumference. New matter is formed in these vital centers this matter previously non-living coming into contact with the living and acquiring its vital characteristics. There is no power of non-living matter at all comparable to this. A complex process goes on, (a) bioplasm selects the nutrient matter from the blood, (b) the blood in turn is tissue and as such is formed by bioplasmic processes. All the blood elements are in reality, the white blood cells or their disintegrated products. The vital action in all cases is at some center of bioplasmic mobility. Hence vitality acts in bioplasmic centers only upon matter that approximates to these centers, preparatory to being itself vitalized. This center of life receives its illustration embryologically in connection with the nucleus of the fecundated ovum, the primary origin of vitality in the newly formed organism. Without this center of life and mobility the new organism would be impossible. Hence the *vital actions* are limited to already existing bioplasm, and this already existing bioplasm in the centers of life renders possible the physical and mechanical phenomena, which we call change of matter. The bioplasm thus possesses a vital force which it can project into the non-living, drawing it closer to its center life and then projecting it outward towards the circumference of tissue and organ formation. Whatever the fundamental bioplasm in the fertilized ovum may be, as it divides and subdivides in drawing within and projecting out from its own centers of vitality, non-living matter, which is causes to pass through formative changes, there still remains somewhere a great center of this vital activity and mobility.

DEVELOPMENT OF TISSUES.

In man the tissues constituting the organism are definitely laid out, before the nerve tissue is developed or begins to act, nerve tissue bing the last to reach the nerve tissue is developed or begins to act, nerve tissue being the last to reach full development. How, then, does this development take place? The bioplasm of the nuclei of the embryo represents the formative force at the center of the substance of the nucleus. This divides and subdivides, forming bioplasms that possess inherent vitality, taking in food and pressing it out to the circumference, until fully formed tissues are developed, the bioplasm being associated with the nerve tissue last developed and fully developed. Here lies the secret of that medicinal action based on food and oxygen and the principle of adjustment, which appeals to the center of the vital force, because only in this way can the circumference of vital matter be reached.

DISEASE DEVELOPMENT.

This is equally true of disease. If the bioplasm increases too quickly its developing power is impaired; resultant tissues are soft and feeble in functioning, because the period of formation has been too short to allow of matur-

ing. On the other hand, if bioplasmic activity is too great there is no tissue development at all. This means that *nutrient matter is too quickly rushed through the centers of vitality to permit of the vitalizing process.* Here we have what takes place in the inflammatory processes, an increased nutrition of the bioplasm of tissue or of the organism as a whole in the febrile states.

Bioplasm lives very slowly, takes on nutritive matter and slowly projects it with vitalized power into the circumference of tissue or of the organism. In inflammatory conditions the bioplasm grows, becomes static, no new matter being formed to be projected outwards, with a probability of permanent damage being done to the bioplasm, preventing future new formation. This explains why destroyed organs or tissues cannot be reformed, because the formed or structural tissues and organs are developed from structureless bioplasmic atoms.

Connective and epithelial tissues are most liable to such rapid increase as is found in inflammation, but any tissue may thus pass into pathological motivity. And from every form of bioplasmic tissue, but especially connective and epithelial, pus corpuscles may be found or formed, these being the degenerated or degraded normal bioplasm corpuscles. Here development takes place pathologically, because all bioplasm tends to grow.

THE BIOPLASMIC ORIGIN OF DISEASE CONDITIONS.

Now in these cases bioplasm is overfed, producing soft tissues, the bioplasm living too fast. The active agent in disease conditions is the degenerated bioplasm, or its particles. The pus corpuscles in connection with septic diseases and the bacteria in contagious and infectious diseases arise from the degenerated bioplasm. These so-called *materies morbi* are not the causes of disease, but are themselves the products of changes in the vital centers and the accumulation of the nutrient elements which favor the growth of the germ as soon as the disturbance of bioplasm exists. Probably in all cases vital action goes too fast, the vital center rushing through itself the nutritive matter with an increased vital activity—too much heat, too much fluid, too much nutrition favor those inflammatory, purulent and febrile conditions which present the conditions of bacterial development, namely, heat, fluid and food. The primary starting point, therefore, in the disease condition is *the deranged, disorganized or obstructed vital activity;* secondly, *this reacts upon the metabolic cycle,* causing the rush of nutritive elements from circumference to center, with the abnormal products in the bioplasm representing degeneration; thirdly, *the pus corpuscles and bacteria are developed and propagated rapidly in the favorable medium,* thus created by disorganization.

NERVE TISSUE IN HEALTH AND DISEASE.

In the highest form of tissue in the body, nerve tissue, we find all of these principles illustrated. Behind the simplest nervous action there lies a nerve current and this can be set free in connection with chemical change. Before such chemical changes take place the material must be formed in connection with the central bioplasm. The current that passes along the nerve fiber is generated in the cell and in its nature it is analogous to electricity. These currents are undoubtedly associated with *nutritive acts,* these being governed

by nerve force. The minute nerve filaments to the capillary blood vessels represent an automatic nerve apparatus connected with blood distribution. If the nutritive process becomes too active, these fibers in the capillaries communicate with the trophic nerve centers in the spinal cord (anterior horns), resulting in the transmission of efferent impulses to the circular muscle fibers of the arterial walls. This diminishes the caliber of the blood vessel and checks the flow of blood to the capillaries, diminishing the amount of nutrition allowed to pass to the tissues. The same nerve apparatus restores nutritive harmony, equalizes the blood supply and balances the nerve forces. In this way the supply of nutrition, the regulation of temperature and the balance of nutrition are preserved—all in connection with the arterial wave action.

All these nerve fibers and centers were gradually prepared for functional activity by a formative process in the bioplasm and only as bioplasmic vitality is preserved will the mechanical functioning of this nerve apparatus continue. The nerve force arises from the changes that take place in these bioplasmic centers. These centers are very closely associated with the sensitive peripheral terminators, especially in connection with th special senses and the terminal expansion of the motor fibers in muscles and other end organs of motivity.

In comparison with these very few bioplasmic particles are found in connection with the nerve distribution in serous membranes.

We are justified, I think, in concluding that the bioplasts at the periphery of the nerves, both superficial and central, have a threefold function; (a) in the formation, preservation and renovation of the complete neural apparatus; (b) in the development of the nerve wavelike currents of sufficient intensity to act as stimuli to the nerve centers, these nerve centers with their bioplasm being the great centers of neural impulse generation; (c) the same bioplasm is concerned in the thermogenic (heat) function (body temperature), especially when an unbalance of the nerve economy exists. Heat is then generated instead of nerve impulses, or rather the heat is not converted into nerve force or energy. This last will explain the relation of the nervous system to the development of temperature, whether physiological or pathological, for example, in febrile states.

In the human subject the activity of every organ and tissue of the body is subject to the higher parts of the nervous system, where the bioplasm is found in greater abundance and complexity. Here we have nerve cells that continue to develop after the rest of the nerve mechanism and the body have attained their maximum. In the caudate cells of the gray matter of the brain we have the centers of fiber formation and the centers of nerve force generation. In the bioplasmic substances found superficial in the gray matter, where the interlacement of fine nerve filaments takes place, we find substances not enclosed in any cell wall, but supplied with such an abundant blood that the changes taking place within them are very rapid. These minute bioplasts are constantly changing during life, and in all probability their close and intimate relation to the nerve filaments forms the basis of a formative function in connection with neural impulses. This is the center of the vital nerve activities Here the dendrite development is most important.

SUMMARY OF FUNDAMENTAL LAWS OR PRINCIPLES OF THERAPEUTICS.

In the principles we have laid down we have the foundation of a number of laws: (a) nutrition moves from circumference to center; (b) vital activity with all its formative energy moves from center to circumference; (c) the central activities are the fundaments upon which peripheral expressions are built; (d) the only rational therapeusis is that which rests upon the central law, that the change in the current of activity must begin at the center, the *vital force,* distributng its curative effects along the pathway of least resistance in the nerve fiber economy, in order to reach out to the weakest part of all the organism and thus restore it to harmony with the rest of the organism; (e) vital adjustment is the law of cure, the purely chemical, physical or mechanical can never cure, unless in so far as these can be converted into a vital equivalent; (f) the nutritive law is that the proximate principle must be supplied in crude form, because this passes in the fluid stream from the circumference to the center of bioplasmic activity, while therapeutic action cannot be effected, through the crude form, because the starting point of therapeutic action is in the central bioplasm; (g) order in the vital economy can never be restored by recourse to counteraction or counterirritation, but only by the application of the law of simillimum, on the basis of the principle of *adjustment.*

The vital force never decreases, never increases, therefore it can restore order only by an orderly distribution of that vibratile activity which from the center of life keeps every organ and tissue in rhythmic relation to the organism. The vibratile adjustment takes place on the scale of the existing maladjustment. (h) When dissolution takes place the central vital activities gradually, from without in, let go the material previously contsructed under their formative action; if this dissolution is checked before it terminates in death the reverse order must be followed in the reaction of the vital force upon the material parts of the organism. Hense the *ab ultima ad primam principle* is the principle or law followed out in the rejuvenescence or restoration of the organism.

These are the basic physical, chemical and biological principles at the foundation of the true system of therapeutics.

THE BALANCE WHEEL OF LIFE.

(i) In the preservation of the organism it is well to remember that the great balance wheel of life is around the spine, the spinal cord and the spinal column representing the mediating influences between brain and body. In the brain the peristaltic variations are regulated by the vaso-motor influences that center in the dorsal spine. In the systemic circulation stasis or equilibrium between the two blood circulating streams is prevented by vaso-motor activity. *Hence the key to the continuous blood circulation is found in the vaso-motors.* Probably everywhere in the body the vaso-motor system holds the balance, acts as the moderating influence or represents the regulative action. This is in line with the idea of the body life as a cycle, complete in itself. Self preservation consists in the due and proper balance of the different cycles we have already referred to.

THE INTERNAL SECRETIONS—OSTEOPATHIC MEDICINE.

(j) Among the most interesting facts of modern physiological life is the doctrine of the internal secretions. These internal secretions represent refining processes to prepare for the closest and most perfect assimilation. One very interesting fact is that the vaso-motor system, the regulative balance wheel, is itself controlled by two of these secretions.

In the ductless glands we find organs which in the earlier life act as blood-forming glands, but in later life their function is transformed into that of blood disintegrating, blood detoxinating glands.

The body embryologically consists of certain segments, or regions, and in each of these segmental regions we find a series of glands. In the head, the pineal gland, whose metabolism in secretion affects the bones and the nervous system, for nutrition; in the neck and thorax the thymus gland and thyroid bodies, the former disappearing as soon as the independent white corpuscle life is established in the child life, the latter remaining through life as a metabolic and seretory glands. The internal secretion of the thyroid is prepared (1) by picking the toxic matter from the blood, (2) detoxinating it, (3) the glands living on the toxic matter and metabolizing the detoxinated material into a secretion which is thrown out into the blood and carried to the nervous system, especially the cerebro-spinal system. It acts as a nutritive fluid. These bodies are very vascular and nervous, especially vaso-dilator. Myxœdematous conditions result from an abnormal condition of these glands, because of nutritive disturbances of the nervous system. The normal functioning of the glands prevents the body from being intoxicated, and as the nerves that enter the glands are strong vaso-dilators, the secretion when emptied into the nervous system stimulates vaso-dilation. Stimulation of the thyroid nerves lessens carotid blood pressure. This means that the secretion of these glands is the main stimulant to the dilator function of the cerebro-spinal nervous system. Here we have the completion of the cycle, the waste of blood is converted into a nerve tonic, that tonic acting so as to promote cerebro-spinal nerve functioning over the blood system. This is part of the internal medicine of osteopathy.

The suprarenal bodies also detoxinate some materials in the blood, forming therefrom an internal metabolized secretion, which through the nervous system has a strong stimulating effect upon the constrictor or inhibitory function of the nerve centers in the medulla, with the result that it stimulates the constrictor effect upon the arterial walls through the sympathetics. Hence this secretion has a stimulating and regulative control of the arterial sway exerted over the blood circulation throughout the entire body. The fact that in the case of the division of the spinal cord and the removal of the medulla the same constrictor effect is produced upon the systemic arteries seems to demonstrate that the substances acts *directly through the sympathetic nervous system.* This is in line with the embryonic origin of the medullary part of the capsules, which allies the medulla of these bodies with the sympathetic system in structure and function. This makes the secretion of these glands stimulative of vaso-constriction.

BLOOD TONICS OF NATURE—ANTI-POISON.

Here we have therefore two sets of bodies which are both concerned in preservative life processes, picking up the waste and toxic elements of the blood, to utilize these in preparing substances used in governing the dilator and constrictor functions of the vascular mechanism, the twin blood tonics of nature.

It is of interest to notice, (1) that the material is furnished from the blood to these glands, and the reaction results in the control of the blood itself, presenting a cyclical action; (2) in order to fit the material for organic use it must be detoxinated. Probably this represents *an organic law, that poisonous substances are not designed normally to reach the centers of vitality, those organs being placed at the gateways of the life processes, to prevent, as far as they can, the passing of toxic agents to the life centers.* Thus the body itself teaches us the deleterious effects of the use of poisonous substances, teaches us not to use crude drug poisons.

We can control these osteopathically, the thyroids from the middle cervical region and the suprerenal bodies from the splanchnic and vaso-motor areas of the lower dorsal and first lumbar regions of the spine.

THE REPRODUCTIVE SECRETION AND THE BRAIN.

The other secretion which is of vital importance in the preservative and reproductive functions of the body is the secretion of the reproductive organs or glands of the body, the secretion of the reproductive sexual organs. Although little is known of this subject, those glands are concerned in a very similar process in metabolizing and forming a secretion, both internal and external, concerned in the preservative and reproductive functions of the body In addition to spermatogenesis and ovagenesis, these reproductive glands form an internal secretion. These organs are not glandular property until puberty, the internal secretory function being more active about puberty. Hence these organs are both duct and ductless glands. Maturity of body and mind develop with the maturation of these organs. It is not unreasonable to suppose that the sexual glands secrete material of service in the nutrition of the brain and the nervous system. Serum therapy has at least in part demonstrated this When these glands are impaired the blood is deficient in nerve and brain food

These sex glands are united to the cerebro-spinal system by double connecting links at the extreme opposite end of the nervous system. Thus the nervous circuit from brain to sex glands is complete and its integrity depends on the same blood waves as the rest of the organism. If these glands are weakened they return to their distinctive animal function, failing in the internal secretory work, thus affecting directly the gray matter of the brain through deficient nutrition. This reacts in turn upon the sympathetic system and there is as a result the upsetting of the rhythmic harmony of the nervous economy such as is found in hysteria, neurathenia, insanity. The re-establishment of the preservative and reproductive function depends upon the adjustment of rbain and glands through the arterial rhythm of the blood system and the connecting nerve fiber system, as they co-operate through the machinery of bone muscle, etc., in the body mechanism.

These are the foundation principles of physiology in osteopathic therapeutics.

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OCTOBER, 1902.

THE REPORTS OF THE STANDING COMMITTEES.

To those who would keep abreast with the affairs of the Association, its past achievements, its present purposes, and its aspirations for the future we would commend a careful, thoughtful reading of the reports of the standing committees, which appeared in the September number of the JOURNAL.

The report of the Committee on Legislation, on the points with which it deals, we believe pretty accurately reflects the ideas of the profession. The chairman of the committee individually expressed himself as being in favor of allowing all systems of healing equal opportunities before the law, of allowing the people, unhampered by restrictive legislation, the right to have the doctor of their choice. Upon this point, with certain limitations, which we have no reason to doubt Dr. Hildreth would also favor, we believe there would be practical agreement among osteopaths. We would have a full knowledge of the human body in health and disease, a common requisite for all who essay to treat the sick, and a special knowledge of the system which a person professed to practice as prescribed by the organized and recognized authorities of that system.

There can be no disagreement, so long as present conditions exist, over the policy of placing the control of the practice of osteopathy with the constituted authorities in our profession rather than with our enemies, and the statement that those in any locality who hope to secure proper legislation must stand and work together and not expect one or two to do it all is wise and timely.

There is one portion of the report of the Committee on Publication in particular that deserves all the emphasis that can be placed upon it, and that is the part dealing with the collection of osteopathic statistics. The committee makes an earnest appeal for the assistance of osteopaths in performing this important work.

The benefits that would accrue from the collection and annual publication of a volume devoted to Osteopathic statistics are so plain as to require no elaboration. No Osteopath in his practice has covered the whole range of disease, and hence is likely at any time to be called to a case with which he has had no previous experience. The profession through its numerous membrs

has doubtless dealt with practically all pathological conditions. The value, then, of having for reference a volume detailing the experience of others with all these conditions cannot be over-estimated. It would afford an intelligent basis of prognosis and suggestions for treatment, and as these volumes multiply they would afford data for a scientific exposition not only of the *how* but the *why* of Osteopathic procedure. Let all help along in this work.

The report of the Committee on Education, embracing as it does, three important subjects, viz: "Publications," "Relation of Members to Each Other and to the Public," and "Standard for Colleges of Osteopathy," comprehends so much and contains so many excellent suggestions that it would be impossible here to particularize. The whole document should be carefully studied.

That portion of the report concerning the standard for colleges, and which is to be the basis upon which the Association will deal with Osteopathic schools in the future is a sufficient refutation of the charge that has been lightly made in some quarters that Osteopaths are ignorant and that the profession has not a proper educational standard.

In order to become familiar with the various lines of work which the Association has in hand, and that the members may all be the better able to aid in its consummation, we recommend a careful re-reading of the reports of the able committees that are giving their best efforts to advance the cause of Osteopathy.

The Montana State Board of Osteopathic Examiners held its second session of the current year Sept. 2, 3 and 4 at Helena, Mont. Officers of the board, president, Dr. Asa M. Willard of Dillon; secretary, Dr. Chas W. Mahaffay of Helena; treasurer, Dr. Orson B. Prickett of Billings. Those successful in passing the examination given and receiving certificates to practice were: Dr. J. E. Stuart, a graduate of the Pacific School of Osteopathy; Dr. Vina Beauchamp, Dr. Helen E. Walker, Dr. Daisy D. Reiger, all from the American School of Osteopathy. They have located as follows: Dr. Stuart at Butte, having purchased the practice of Dr. W. H. O'Neill of that place; Dr. Beauchamp at Anaconda, Dr. Walker at Great Falls and Dr. Reiger at Red Lodge.

We again call attention to the fact that all persons who became members of the Association at the beginning of this year, or since, whether by election or re-instatement, are entitled to volume I. of the JOURNAL. They will be furnished, unbound, free, or bound in cloth for 50 cents. Some have taken advantage of this offer, but a great many have not indicated their choice in the matter.

The Northwestern College of Osteopathy, formerly located at Fargo, N. D., has been consolidated with the S. S. Still College of Osteopathy, of Des Moines, Iowa. This is the third Osteopathic College that has been absorbed by the Des Moines institution.

We received the Secretary's report of the proceedings of the meeting of the Associated Colleges of Ostopathy since the September number of the JOURNAL was issued. From it, in addition to the matters mentioned in the September number, we gather the following items:

The applications for membership in the Association of the Illinois College of Osteopathy and the Rhode Island College of Osteopathy were rejected.

Steps were taken to have the Associated Colleges incorporated, and the matter was placed in the hands of the Executive Committee.

It was decided that after September 1, 1903, classes would be matriculated but once a year.

The following are the officers for the ensuing year:

President—Dr. S. S. Still, Des Moines, Iowa.

Vice-President—Dr. Robert Collier, Franklin, Ky.

Secretary-Treasurer—Dr. H. I. Hewish, Wilkes-Barre, Pa.

The papers of Drs. Booth and Littlejohn, which appear in this number of the JOURNAL, will be kept in type for ten days, and if enough orders for them are received to warrant they will be put in pamphlet form. The price will not exceed $2.00 per 100, sent postpaid.

If there is a demand for it within the time above mentioned and at the same price, that part of the report of the Committee on Education dealing with "Standard for Colleges of Osteopathy," will also be put in pamphlet form. It has occurred to us that with a certain class of people this report would make excellent campaign literature.

The Association needs new members, and it needs the money that is due from the old members, but as the JOURNAL reaches only those whose dues are paid we can make no direct appeal either to those who should become members or to those who should pay their dues. We can, however, urge all our readers to do as many have done, and that is, to act as missionaries in bringing new members into the Association, and in inducing old ones to square themselves with the treasurer.

Dr. and Mrs. Walter Steele returned from abroad on the 14th instant. Mrs. Steele made an extended tour of the Continent, the doctor joining her in Scotland and returning from there. Dr. Steele is President of the New York Osteopathic Society, and, with his practice in Buffalo, a very busy man.

Blanche Isabel Thoburn, A. B., D. O., late professor of histology and pathology at S. S. Still College, has accepted the chair of English Literature at the Iowa Wesleyan University, Mt. Pleasant, Iowa.

Dr. Geo. J. Helmer is the happy father of a ten-pound son, the first boy to gladden his heart. The doctor has returned to New York for the winter after a long rest in Vermont.

Dr. Mary E. Kelley of Chicago spent ten days recently with relatives at Detroit and Mt. Clemens, Mich.

Dr. Henry C. Cupp, of Memphis, Tenn., and Fannie Owen Hogg, of Pine Bluff, Ark., were married in the latter city on September 25, 1902.

Dr. and Mrs. C. H. Whitcomb have returned to their home in Brooklyn after a much needed vacation on Isle la Motte, Vt., Mrs. Whitcomb's former home.

MICHIGAN OSTEOPATHIC ASSOCIATION.

The annual meeting of the Michigan Osteopathic Association was held Sept. 6 at the Cook House, Ann Arbor. The morning session was devoted to the reading of a paper by Dr. George H. Snow of Kalamazoo, "Echoes of the Milwaukee Convention." It was supplemented by remarks from Dr. Edythe Ashmore of Detroit. A discussion of the Michigan osteopathic law followed and cases of illegal practitioners were stated by Drs Longpre and Bernard. A luncheon of six courses was served at 12 o'clock and the afternoon session opened with the roll call and minutes of the last meeting. Drs. Ashmore, Church and Rider were appointed press censors for the meeting. The constitution was amended to provide for the election of officers at the close of each annual meeting. The by-laws were amended to provide for a legislative committee of three, who should investigate the cases of illegal practitioners of osteopathy in the state and report the procedures necessary for the protection of regularly licensed osteopaths, and if necessary, seek to amend the present state law. The committee nominated were Drs. Cully of Flint, Longpre of Battle Creek, Swarz of Coldwater.

The opinion of the attorney-general of Michigan upon the signing of death certificates by osteopaths was then read. The opinion rendered was that it is our legal right to do this.

A clinic patient, suffering from inflammatory rheumatism, was brought forward by Dr. W. S. Mills of Ann Arbor. Lack of time prevented the full presentation of the case. The time of meeting was then changed to the third Saturday in August, and the constitution amended to that effect. Grand Rapids and Adrian were debated upon for the place of the next meeting, and Grand Rapids secured the honor.

The election of officers followed. Dr. George H. Snow of Kalamazoo was elected president and a telegram of the announcement sent him, to which he replied by a message of thanks. The other officers elected were: Dr. W. S. Mills, Ann Arbor, vice-president; Dr. F. H. Williams, Lansing, secretary; Dr. H. B. Sullivan, Detroit, treasurer; executive committee, Drs. Ashmore, Detroit; Martin, Battle Creek; Jennie Wycoff, Bay City; G. Seeley, Grand Rapids.

On motion of Dr. Rider a preparation of the program was called for and ordered printed not later than three months before the annual meeting.

Nine new members joined the association, J. S. Blair, Minnie Dawson, John Garrett, R. A. Glezen, E. Longpre, R. B. Martin, R. B. Pebbles, C. L. Rider and George Seeley.

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